GALUCHO

OPERATOR'S HANDBOOK AND SPARE PART'S LIST

SPRING LOADED TINE TILLERS

SERIES ➡ ME-D
E-D
E-DC

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RECOMMENDATIONS TO THE OWNER

The decision to opt for GALUCHO was a good one. The result of many years of
experience, under the most difficult and diverse working circumstances, GALUCHO material gives complete satisfaction to its many thousands of users, both in Portugal and in over 40 countries, of different continents, where it is already at work. We are sure that, if used properly, and given the necessary care to maintenance, the machine you have just acquired will perform the efficient and economical job for which it was designed, and which a user has the right to expect from it. The present manual contains very important instructions concerning set-up, tuning, maintenance, etc., As well as diagrams and a parts list.
Begin by reading it, attentively, in order to familiarise yourself with the material. Then, keep it in secure and accessible place, for future consultation.
If you still have doubts, consult the distributor who supplied the machine, or else consult us, as it is in all of our interests that you be satisfied with, and obtain maximum yield from your purchase.
Recordings and technical data are indicated by name and subject to alterations without
previous notification.

GALUCHO - Indústrias Metalomecânicas, S.A.
Av. Central, N.º 4
2705-737 S. João das Lampas - Sintra, Portugal
Telef.:21 960 85 00 Fax:21 960 85 99
www.galucho.pt
info@galucho.pt

CONDITIONS OF GUARANTEE

1- Our company guarantees all the agricultural equipment which is manufactured for a period of two years from the date of invoice.
1.1- This guarantee only includes the supply of replacement parts or components which are proved to be deficiently made or installed, and does not cover the payment of manual labour or displacement costs.
1.2- Any components considered by this company to the worn out, are excluded from the guarantee.
1.3- The guarantee given by this company will not include any parts not made by themselves, for examples tyres, which will remain the exclusive responsibility of their respective manufacturer, and this decision will be communicated to the claimant with all its consequences.

2- Reasons for immediate loss of guarantee:
2.1- Use of equipment in abnormal working conditions, or used with tractors of different powers than those indicated, in each different case, in our technical literature.
2.2- The substitution of pieces or accessories for others not made or recognised by this company.
2.3- Any repair or alteration done, during the period of guarantee, without our knowledge or authorisation.

3- All claims against the guarantee must be communicated to us by the respective retail agents, by means of a claim form. The pieces or accessories, which are the objects of complaint, must be sent for examination to our Technical Services and Quality Department.
If the reasons for the complaint are confirmed and accepted, new pieces will be supplied, or their value credited to the customer, if already sent.

4 - The powers indicated in our catalogues and other literature as necessary for certain equipment of our construction, may vary according to the different types and states of
the earth, the experience of the operator, the state of the tractor, and the adherence of the latter to the terrain on which it is working.
5 - This company can only accept the return of equipment to the factory, within a maximum of 15 days after the sending of the invoice, providing it has not been used in a working situation, it is not a model already withdrawn from production, or if it is still part of our production range, there have been no alterations made to the model.

6 - In compliance with regulations determined in the Directiva Máquinas/CE (Machines Directive/CE), this company:
6.1 - Manufactures its machines respecting the relevant safety regulations, namely with respect to the protection of moving parts;
6.2 - Supplies a certificate of conformity, referring to the norms and regulations fulfilled;
6.3 - Supplies a user's manual and catalogue of parts for each machine.

NOTE: Every Galucho dealer is obliged to supply the eventual consumer with:
- The safety devices, fixed or detachable, relevant to each machine;
- The certificate of conformity and the user's manual with a catalogue of parts for each machine.

7 - We recommend the reading of our pamphlet: “General Conditions of Sale and Payment”.

8 - For any necessary clarifications, please consult our Commercial Services.

INNOVATIONS

GALUCHO-IND. METALOMECÂNICAS, S.A. Continually attempts to perfect its products, reserving itself the right, at any time, to make alterations to the design and/or to the specifications of construction materials, and its respective components, without incurring, as a result, the obligation to apply these alterations to machines previously made and sold.

1- EXPLANATORY NOTE

Being similar the conception of the different series of Tillers GALUCHO, all of them are included in this same one manual.
Quick differences eventually existent in the different series don't impede that the same drawing can be to show any of their components or relate a tuning. If that happens, different drawings will be repeated in order cannot be any doubts.

2- CONSTITUTION

ED AND EDC SERIES

FRAME - Includes two square bars (Fig. 1-A) and two connecting pieces where headstock (Fig. 1-D) is attached. There is a bracing on models having 11-13-15 and 17 tines; supports all attaching boxes (Fig. 3 and 4);
HEADSTOCK - contains three point linkages to tractor.
ATTACHING BOXES - are attached to the frame; consisting of the springs and tine set (Fig. 3-E). Front tines are mounted on short attaching boxes (Fig. 1-F) and the rear ones on long attaching boxes (Fig . 1-G), as well as, curved tines used on EDC series.

MED

ED

EDC

MED SERIES

FRAME - Consists of trunnion bracket and two bars were other two simple bars are attached. It also Supports headstock and attaching boxes
HEADSTOCK - contains three point linkage to tractor;
ATTACHING BOXES - are attached to simple bars; Consist of the springs and all tine set. Front tines are mounted on short attaching boxes and rear ones on long attaching boxes.

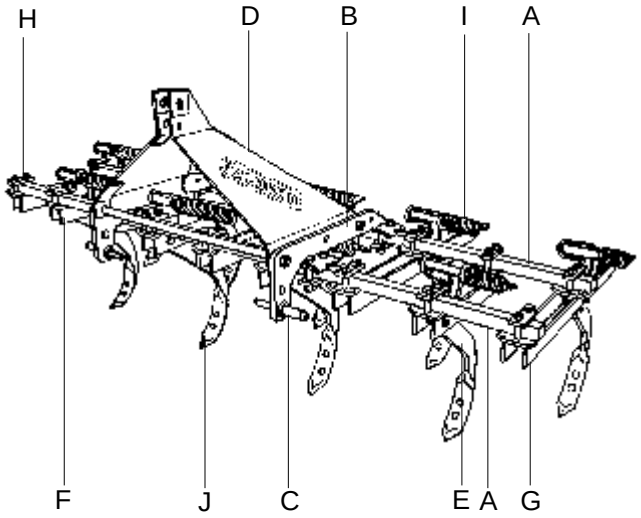

Fig. 1

A - Square bars; **B** - Supports; **C** - Link pins;
D - Headstock; **E** - Tines; **F** - Short box; **G** - Long box;
H - Transversal support boxes; **I** - Springs.

3 - ASSEMBLY AND LINKAGE TO THE TRACTOR

Spring loaded tine tillers can be delivered entirely assembled. Whenever is necessary, you may disassemble the headstock. To fully assembly just tight headstock fixing screws. For any doubts please, consult parts list attached to this operator's handbook.

Linkage is equal as to all mounted implements. Attach both lower arms to the link pins and top link to the headstock upper hole. There are different linkage possibilities according to tractor's model, you mast choose the most suitable to your one case. After tine tiller is attached to tractor, you should proceed to the necessary adjustments, as further references in "ADJUSTMENTS"

4 - TECHNICAL SPECIFICATIONS

MODELS	Nº OF TINES	TRANSPORT WIDTH [m]	WORKING WIDTH [m]	WORKING DEPTH [m]	WEIGHT [kg]	REQUIRED POWER [cv]	[kw]
ME - 5D	5	1,35	1,35	0,10 - 0,20	170	15 - 30	11 - 22
ME - 7D	7	1,89	1,89	0,10 - 0,20	225	20 - 35	15 - 26
E - 5D	5	1,35	1,35	0,15 - 0,30	195	20 - 35	15 - 26
E - 7D	7	1,89	1,89	0,15 - 0,30	265	30 - 45	22 - 33
E - 9D	9	2,43	2,43	0,15 - 0,30	330	35 - 60	26 - 44
E - 11D	11	2,97	2,97	0,15 - 0,30	445	45 - 70	33 - 51
E - 13D	13	3,51	3,51	0,15 - 0,30	520	55 - 80	40 - 59
E - 15D	15	4,05	4,05	0,15 - 0,30	665	60 - 100	44 - 74
E - 17D	17	4,59	4,59	0,15 - 0,30	730	70 - 115	51 - 85
E - 21D	21	5,67	5,67	0,15 - 0,30	850	85 - 130	63 - 96
E - 7DC	7	1,89	1,89	0,15 - 0,30	230	30 - 45	22 - 33
E - 9DC	9	2,43	2,43	0,15 - 0,30	300	35 - 60	26 - 44

5 - ADJUSTMENTS

5.1 HORIZONTALITY - Transversal and longitudinal

Transversal horizontality - Lower arms of tractor's hydraulic system should be set at the same height, which is obtained through lift rod. This will allow tine tiller to work completely horizontal and ensure even depth. Check if lifting arms length is equal, this will also ensure that, tine tiller is horizontal;
Longitudinal horizontality - Shorten or lengthen top link, until you get the same penetration of front and rear tines.

5.2 - WORKING DEPTH

May be adjusted by:
- Tractor's hydraulic system;
- Depth control wheels, which are provided with several adjusting holes. They should always have the same level, on each side.

In case you change working depth during work, check and adjust, if necessary, longitudinal horizontality.

5.3 - TINE SPACING

When used in row cultures, it is possible to change distance between tines of tine tillers or even take off same of them.
To obtain these displacements you only need to loosen tightening plates screws that fix attaching boxes and move them to desired position, after this, just tight referred screws. If you want to work with fewer tines, turn up the remaining ones, to avoid any decrease in frame resistance.
Whenever you change tines position, keep in mind that tines must be mounted symmetrically to tractor's axle. In case that spring-loaded tine tiller is fitted with depth control wheels, they must be mounted always behind a tine in order to erase wheel tread.

5.4 - TENSION OF SPRINGS

Whenever you notice during work springs have lost elasticity or you need to use the “GALUCHO” tine tiller on a heavy land, you should increase the tension of the springs, by placing them on the second position as per Fig. 2.

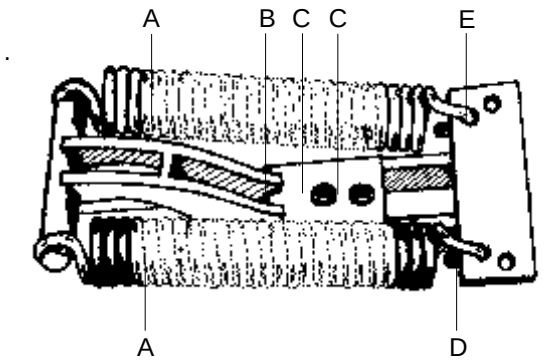

Fig. 2
A - Springs; **B** - Stop; **C** - Stop fixing screw; **D** - Front hole; **E** - Rear hole.

To obtain referred tension proceed as follows: Loosen fixing screws and take off the stop (Fig. 2-C) in each tine; after place them in rear hole (Fig. 2-E). To replace the stop (having tine tiller attached to tractor) fix each tine share on a steady point, and move slightly tractor enabling stop adjustment, as well as, its attachment.

6 - TILLAGE OPERATIONS

GALUCHO spring-loaded tine tillers may be used on three different tillage operations, according to share type:

6.1 - REVERSIBLE SHARE - This is the scarifying type of share, and it is standard equipment; these working parts can penetrate more or less allowing soil aeration as well as soil softening throwing to the surface the broken clods. There is also slight weed destruction, especially rhizomes.
This cultivating work should be done continuous ranks, avoiding tight turns, when tine tiller is working. In case you need a second pass, it should be made in angle of 45º with first pass.

6.2 - EXTIRPATOR SHARE - Replacing reversible shares by extirpator shares. (Fig. 5-A), soil softening as well as a weeding operation is obtained.

6.3 - COVERING SHOVEL - These working parts are mounted on rear tines of tiller. In order to mount them, proceed as follows: remove reversible shares, place COVERING SHOVELS (Fig. 5-B) then put on the referred share.

6.4 - WORKING EFFICIENCY

Working efficiency depends on several factors, notwithstanding we think fit to formulate its calculation:

Vt - Working speed (Km/hour);
Lt - Working width (m);
Ec - Efficiency. This correction factor changes according to work type; it is function of soil's nature and conditions, land's dimension, operator's efficiency, etc.
We suggest to take a medium value of Ec = 0,8

EXAMPLE: Which will be the medium working efficiency per hour of a tine tiller having a working width of 3,52m (E-13D model) and operating at 8 Km/h.

$$Rt = \frac{Vt \times Lt \times Ec}{10} \qquad Rt = \frac{8 \times 3{,}52 \times 0{,}8}{10} = 2{,}25 \text{ ha/h}$$

7 - MAINTENANCE

To keep any agricultural implement in good working order and longer life running, it is therefore necessary to adopt the following procedure:

7.1 - BEFORE EACH WORKING DAY

Check carefully all tine tillers specially:
- Screws and nuts tightening;
- Working parts (reversible shares, extirpator shares and covering shovels) wear grade. In case of reversible shares you can invert or even replace them by new ones if necessary.

REMARK: Share wings in bad condition demand an higher power.

7.2 - DURING WORK

- New implement: all screws and nuts should be fully tightened at the end of first working day;
- Lubricate as follows:
- Every 8 working hours
  Grease: - Bushing of tine articulation (one on each tine);
- Axles of depth control wheels.

7.3 - STORAGE AND PRESERVATION

- When not in use, the tine tiller should be kept from rain on a dry and steady surface;
- Repair or replace whatever is necessary;
- Any damage to paintwork should be touched up and provide as well a throughout lubrication.

Proceeding this way, tine tiller will be ready for nsxt season.

REMARK:
- Clean grease nipples properly before and after greasing;
- Use hand grease pump to fill up, until clean grease comes out.

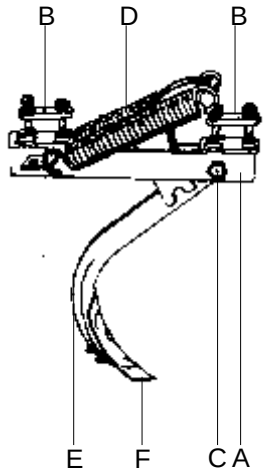

Fig. 3

A - Short box; **B** - Tightening plate; **C** - Articulation with bushing; **D** - Springs; **E** - Tine; **F** - Reversible share.

8 - REPLACEMENT OF MOST WEARING PARTS

These components are subject to most wearing and so they should be replaced from time to time.

8.1 - SHARES - In case of reversible shares (Fig. 3-F) to reverse or replace them, you only have to untight their fixing screws and after reversing or replacing of shares just retighten fixing screws. Often these screws are in bad condition and their replacement it is also needed. To replace the other working parts (extirpator shares - Fig. 5A; covering shovels - Fig. 5-B) proceed as previously referred to reversible shares.

8.2 - BUSHINGS - (Fig. 4-A) - Untighted nuts or neglecting lubrification can cause damage of bushings and fixing screws, therefore replacement will be necessary. Proceed as follows: release springs (using same procedure as to tension of spring adjustment); remove bushing by a new one. After the assembly, lubricate this set. GALUCHO bushings are treated, so they have a long life.

8.3 - TINES AND SPRINGS - Generally these pieces are seldom replaced. TINES (Fig 3-E) - You should replace them in case of wearing due to too much working depth or due to work shares or even when tines break up in really bad working conditions.

SPRINGS (Fig 4-E) - Their replacement is made as to spring tension adjustment. They should be replaced whenever they break up, if they are rusted or even if the springs have lost their elasticity.

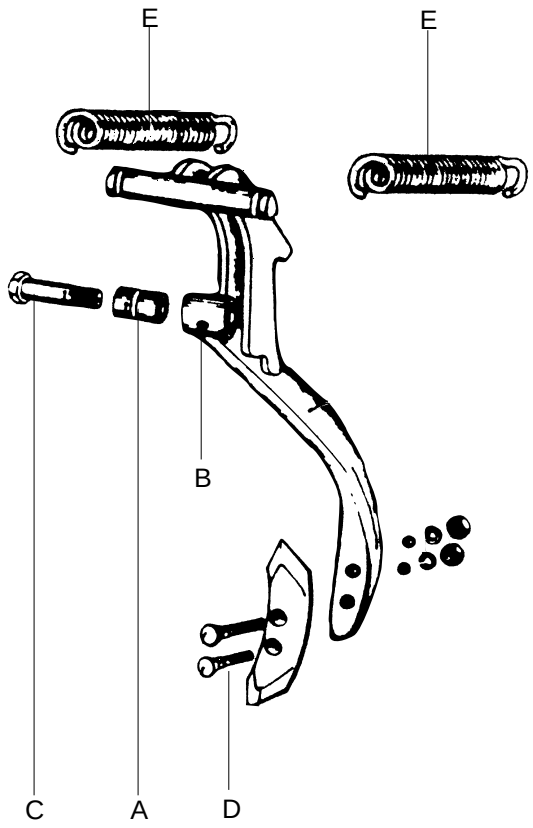

Fig. 4

A - Bushing; **B** - Grease nipple; **C** - Fixing screw; **D** - Share fixing screw; **E** - Spring

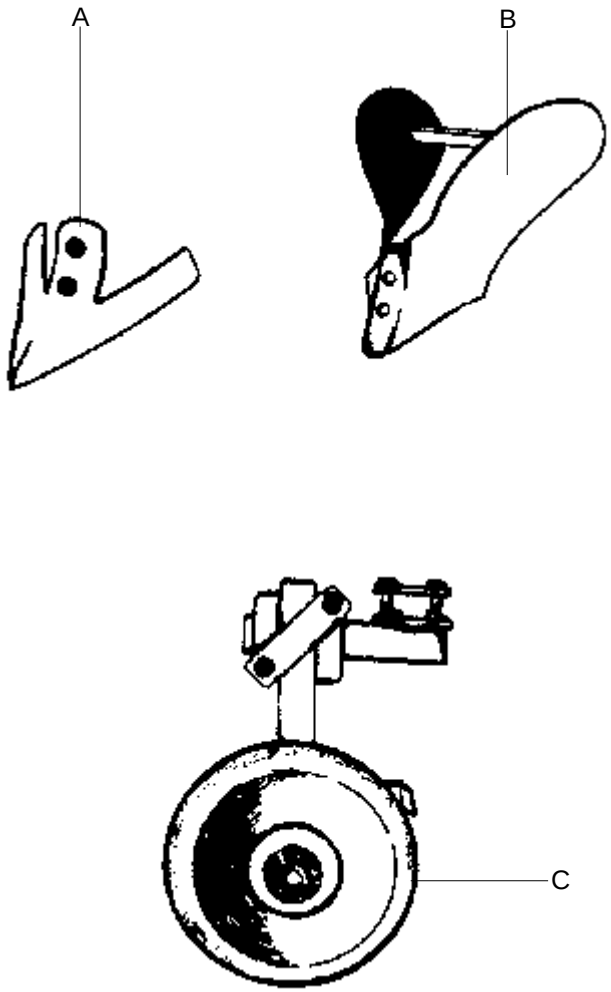

Fig. 5

A - Extirpator share; **B** - Covering shovel; **C** - Depth control wheel

9- PRACTICAL ADJUSTING LEADS

POSSIBLE CAUSE / POSSIBLE REMEDY	EXTENDED UPPER HYDR. ARM	SHORTEN UPPER HYDR. ARM	REGULATE 3rd POINTS	RAISE THE 3 HYDR. POINTS	LOWER THE 3 HYDR. POINTS	UTILIZE TRACTION CONTROL	REDUCE SPEED	BLOCK DIFERENTIAL	AD BALLAST WHEELS	ADD WEIGHTS TO FRONT OF TRACTOR	RAISE DEPTH CONTROL WHEELS	LOWER DEPTH CONTROL WHEELS	REDUCE WORK NUMBER TINES	WAIT THE BEST LAND SEASON
DEEPER ON ONE SIDE			●											
DEPTH INSUFFICIENT					●						●			
DEPTH EXAGERATED				●								●		
FRONT TINES TOO DEEP	●													
BACK TINES TOO DEEP		●												
TRACTOR SKIDDING				●		●		●	●			●	●	
BLOCKED							●						●	●
TENDENCY OF TRACTOR TO TIPE										●				

* IR REQUIRED

10- SECURITY REGULATIONS

Working with tractors and agricultural machines requires that the operator knows what he is doing and that much care is taken. He must be conscious and cautious of the dangers which imprudence can cause, not just to the agricultural enterprises which they run. In an attempt to avoid accidents, therefore, we advise the following security rules:

1 - In attaching any implement to the tractor, use only the place which the respective manufacturer advised for the operation, verifying is carried out in order.

2 - Whenever, for reasons of repair, checks, set-up or otherwise, you need to get under the implement, never do so without the relevant props.

3 - In activating the hydraulic system of the tractor, first check that the implement, trailer, frontal load, or otherwise, in movement, can not reach anyone.

4 - Never authorise the transport of passengers on the implement, whether during work time or on the road, equally not behind ploughs, or grass cutters, as during their work, as stones, sticks etc. could fly up out of the machines.

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5 - The implement should never be detached while in movement. If it has to be done, immobilise it well and stop the motor.

6 - Always use protective guards on transmissions linked to the power sockets of the tractor.

7 - Use counterweights on the front or on the front wheels, as, with implements mounted, the steering of the tractor will be very light and it will have a tendency to uplift. Double check the maintenance during a job, manoeuvres or on the road. It could also be necessary to mount a rear weight to the tractor when operating with a frontal load and the load being carried is particularly heavy.

8 - Do not forget that the dangers increase with the incline of the terrain on which it is working or being moved. Exercise maximum caution, paying attention to accentuated inclinations, especially lateral ones, which should be avoided.

9- When you work with trailers, you should never forget to:
- Check your brakes;
- Attach the emergency brake device to the tractor;
- Plug in the electric installations;

Also remember that:
- The trailer must always brake before the tractor;
- All load, especially high load, must be well fastened down;
- The two pins to fix down the box must be in the right places, depending on the side which you need to balance;
- The balancing must be light, and without jolts;
- You may only transport persons when legally authorised to do so, when they are seated, and with all the coverings closed.

10 - Whenever in transit on a public highway remember that:
- On leaving an agricultural property, or a private road, you never have priority of entry into a public road. All other road users, coming from the left or right, have priority over you;
- You must respect the highway code and all signs and light signals;
- The stabiliser switch for the two brake pedals must be on;
- The stabilisers or the chains must be tight so that there can be on lateral oscillation of the mounted implements, which must only be lifted to the height necessary to avoid contact with the ground (about 0,30 cm) or, if the tractor has a hydraulic blockage, until this switches on;
- Speed of travel must be reduced whenever the state or the relief of the road requires it;

If you take this advice which we give here, we hope that you will neither have, or cause any accidents. This is what GALUCHO wishes for, and expects from their clients.

11- ORDERING SPARE PARTS

We advise you, as farmers, that replacing worn out parts at the right moment will avoid abnormal mobilization of the machine (with the consequent loss of money and time), and will cheapen the units of work produced, and prolong its useful, economical life-span.

It is always better to use genuine GALUCHO parts, because:
- They are perfectly interchangeable;
- They guarantee correct adaptation and functioning.

While they could, in some cases, be a little more expensive in terms of initial cost, they always end up more economical than any other.
To simplify and speed up the supply of spare parts, it is recommended, in the consumer's own interests, that this procedure is followed:

1- Indicate the model, series, and number written on the identification plate, which each machine has

2- Outline the quantities, codes, and designation of the parts, as indicated by the catalogue of parts.

3- To avoid errors, written confirmation of orders eventually transmitted by telephone is indispensable.

4- To facilitate the completion of orders, all demands must be made separate from other correspondence, and indicate the destination and the transport to be used. In case the client has no current account with our company, he should enclose with his order, the amount that corresponds to the cost of his demand.

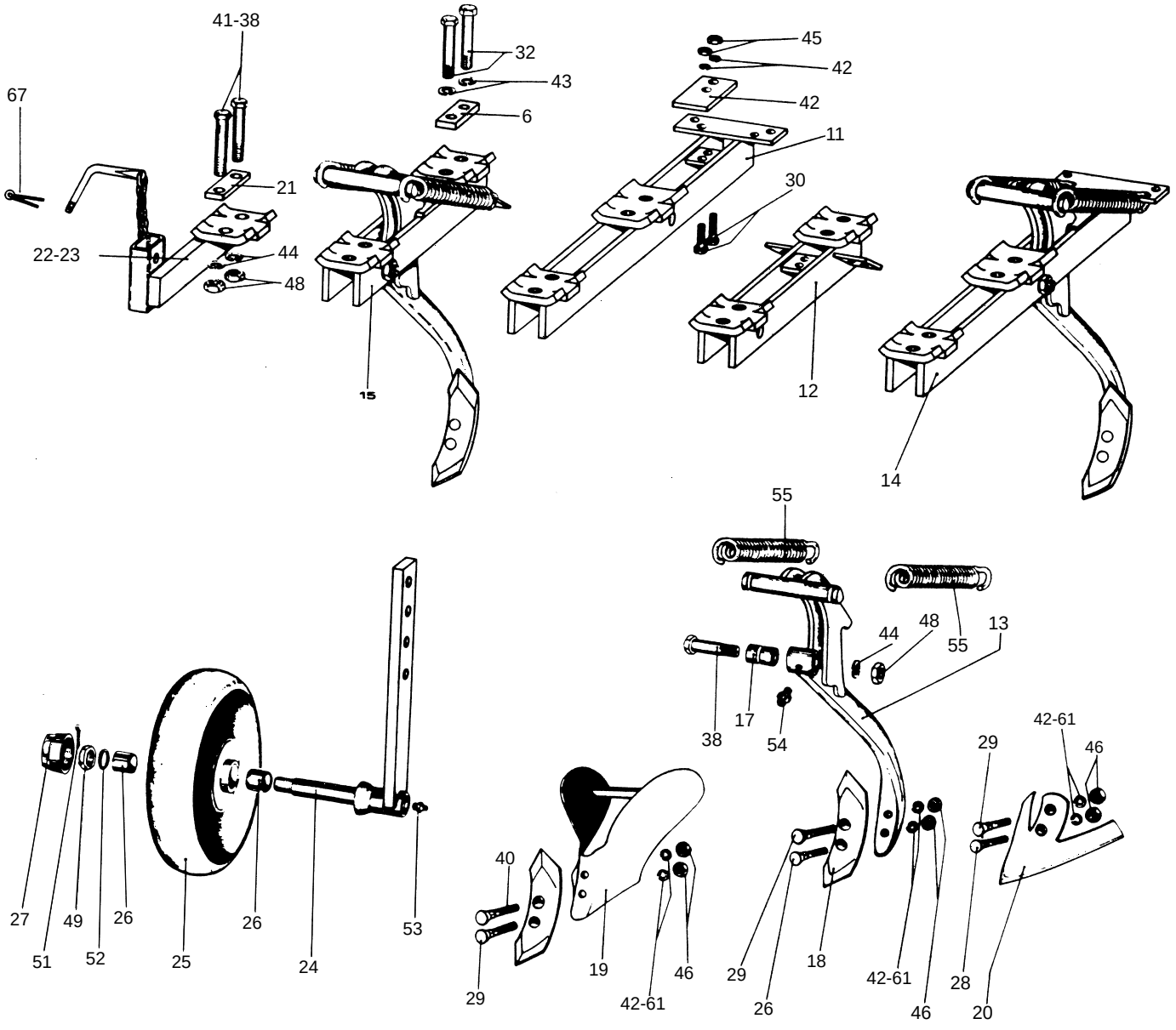
If the demand omits a preference, in terms of means of transport, we will use that which we feel to be most advantageous.

5- The parts can be picked up from our warehouses, in S. João das Lampas, or placed by us in the railway or any other station, in Sintra or Lisbon.

6- The return of parts or equipment whose parts have stopped being made, or which are still part of our production line but have been altered, will not be accepted.

The identification plates GALUCHO indicate the following specifications, which will be useful when ordering spare parts.

1- MODEL 2- SERIE 3- NUMBER



ME-5D E-11D
ME-7D E-13D
ME-9D E-15D
E-5D E-17D
E-7D E-19D
E-9D E-21D

Desen.	Verif.	Alter.	Designa. SPRING LOADED TINE TILLERS	Serie ME/E	GALUCHO INDÚSTRIAS METALOMECÂNICAS, S.A. S. JOÃO DAS LAMPAS - PORTUGAL
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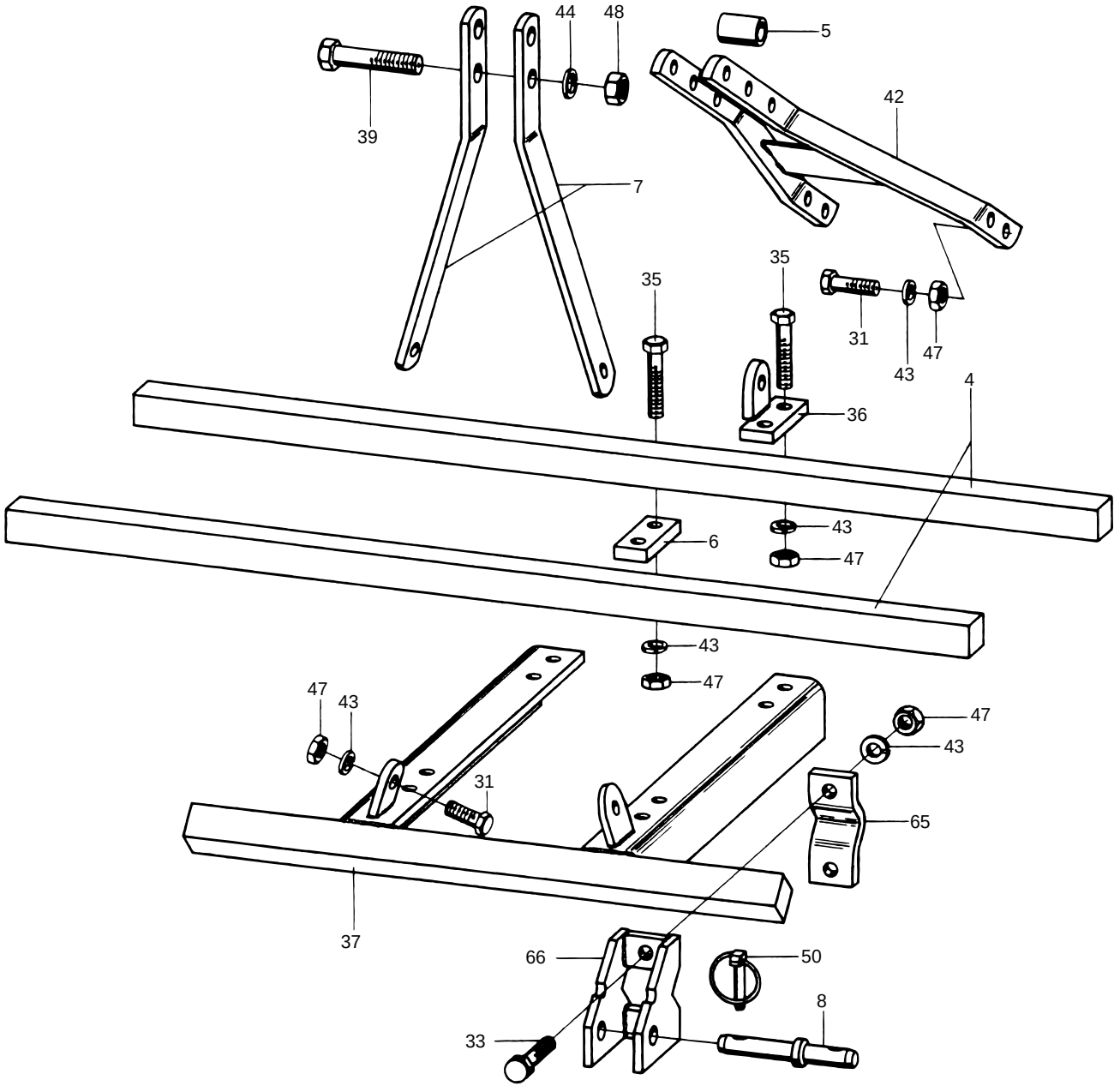

ME - 5D ME - 7DC
ME - 7D ME - 9DC
ME - 9D

Desen.	Verif.	Alter.	Designa. SPRING LOADED TINE TILLERS	Serie **MED**	**GALUCHO** INDÚSTRIAS METALOMECÂNICAS, S.A. S. JOÃO DAS LAMPAS - PORTUGAL
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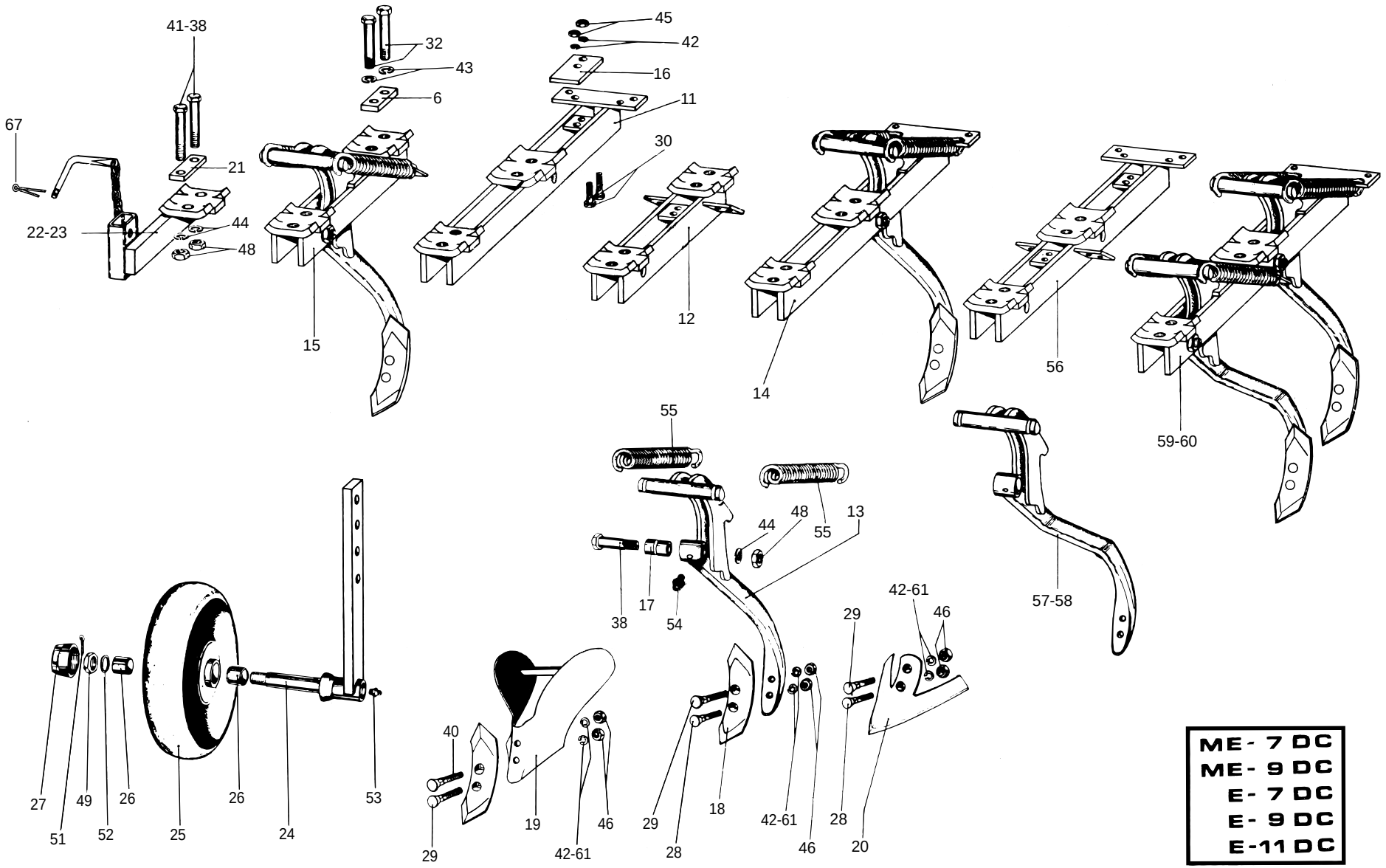

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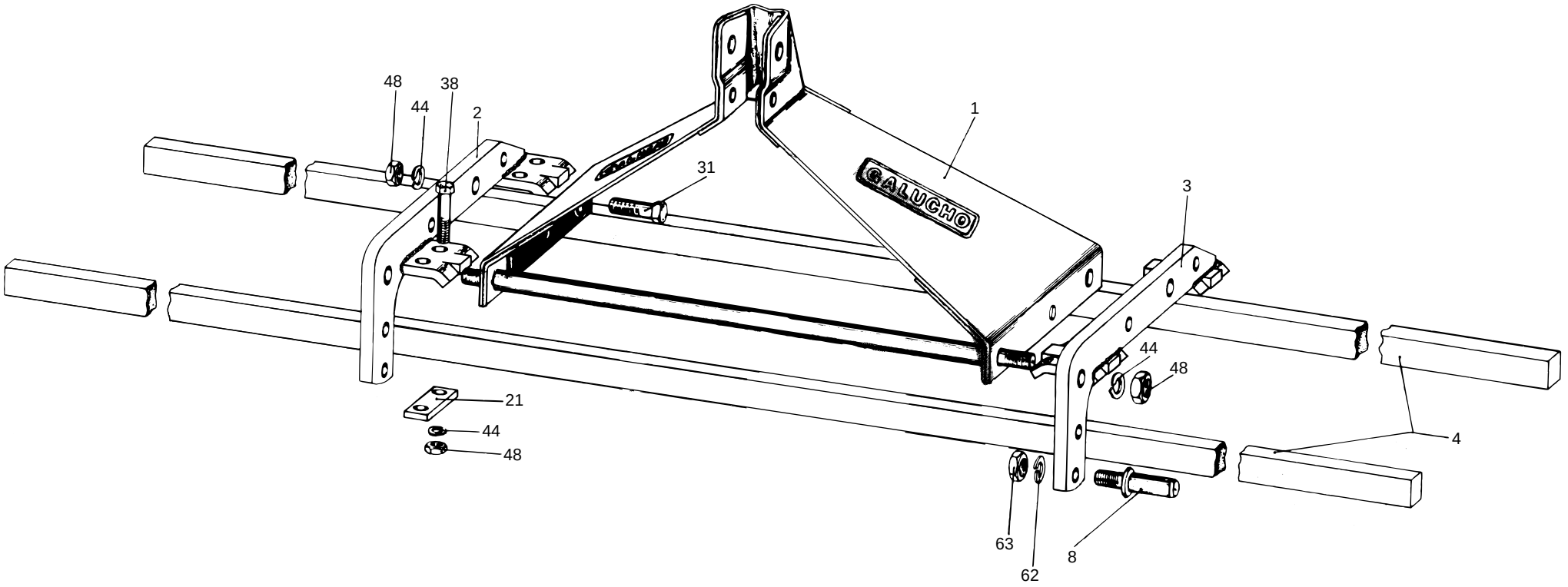

E-7D
E-9DC

Desen.	Verif.	Alter.	Designa. SPRING LOADED TINE TILLERS	Serie **ED/DC**	**GALUCHO**
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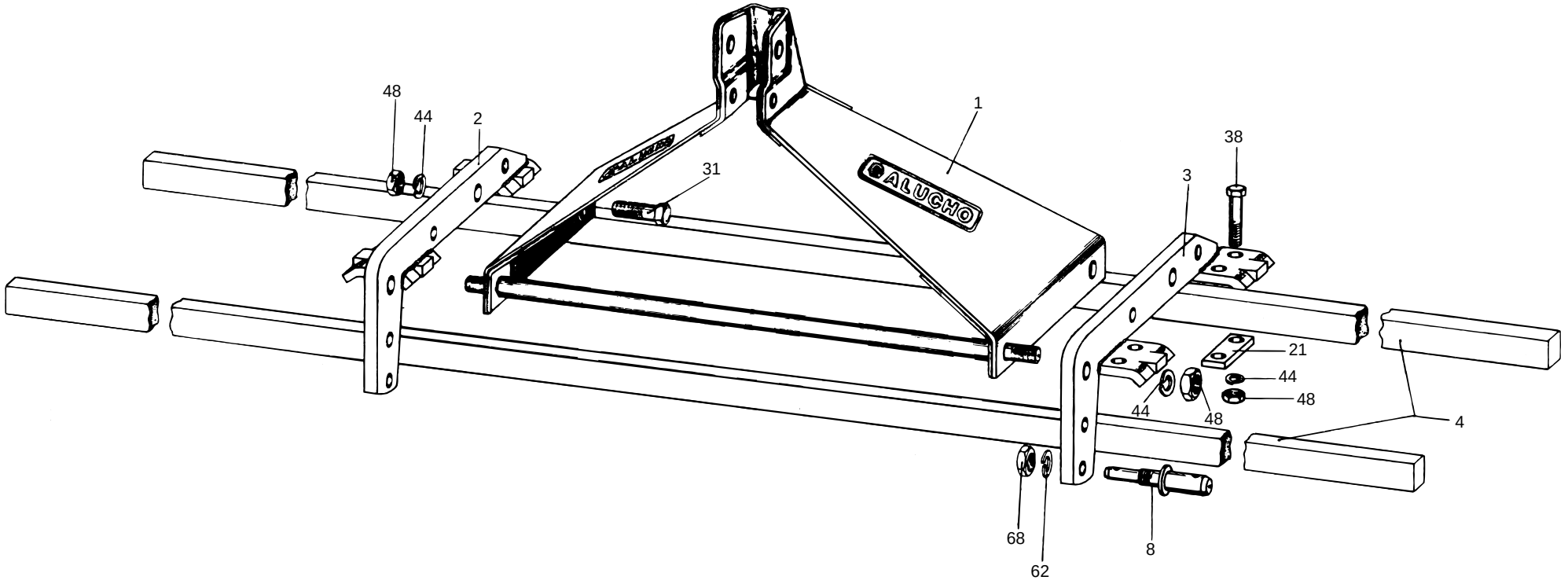

E-9D
E-11DC

Desen.	Verif.	Alter.	Designa. SPRING LOADED TINE TILLERS	Serie **ED/DC**	**GALUCHO**
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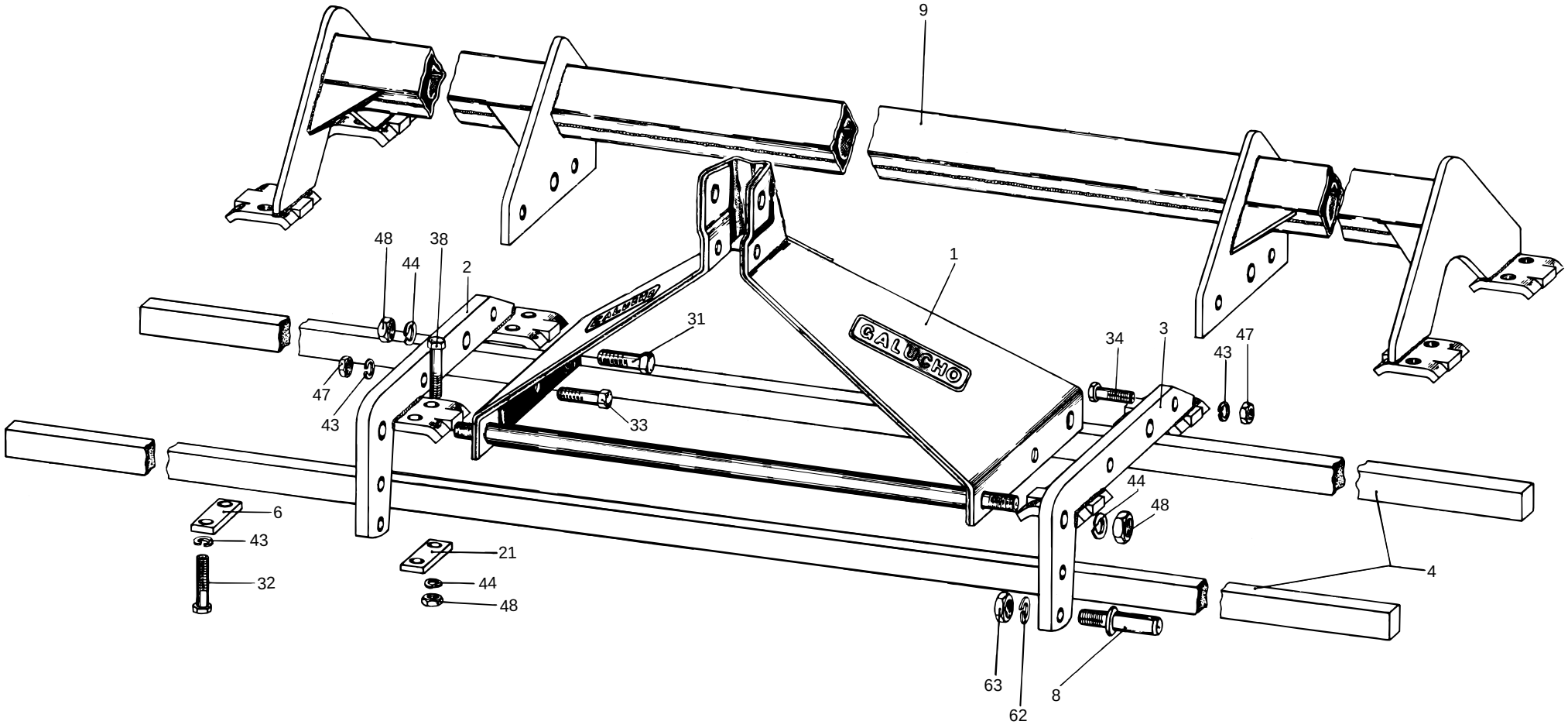

E-11D

Desen.	Verif.	Alter.	Designa. SPRING LOADED TINE TILLERS	Serie **ED**	**GALUCHO** INDÚSTRIAS METALOMECÂNICAS, S.A. S. JOÃO DAS LAMPAS - PORTUGAL
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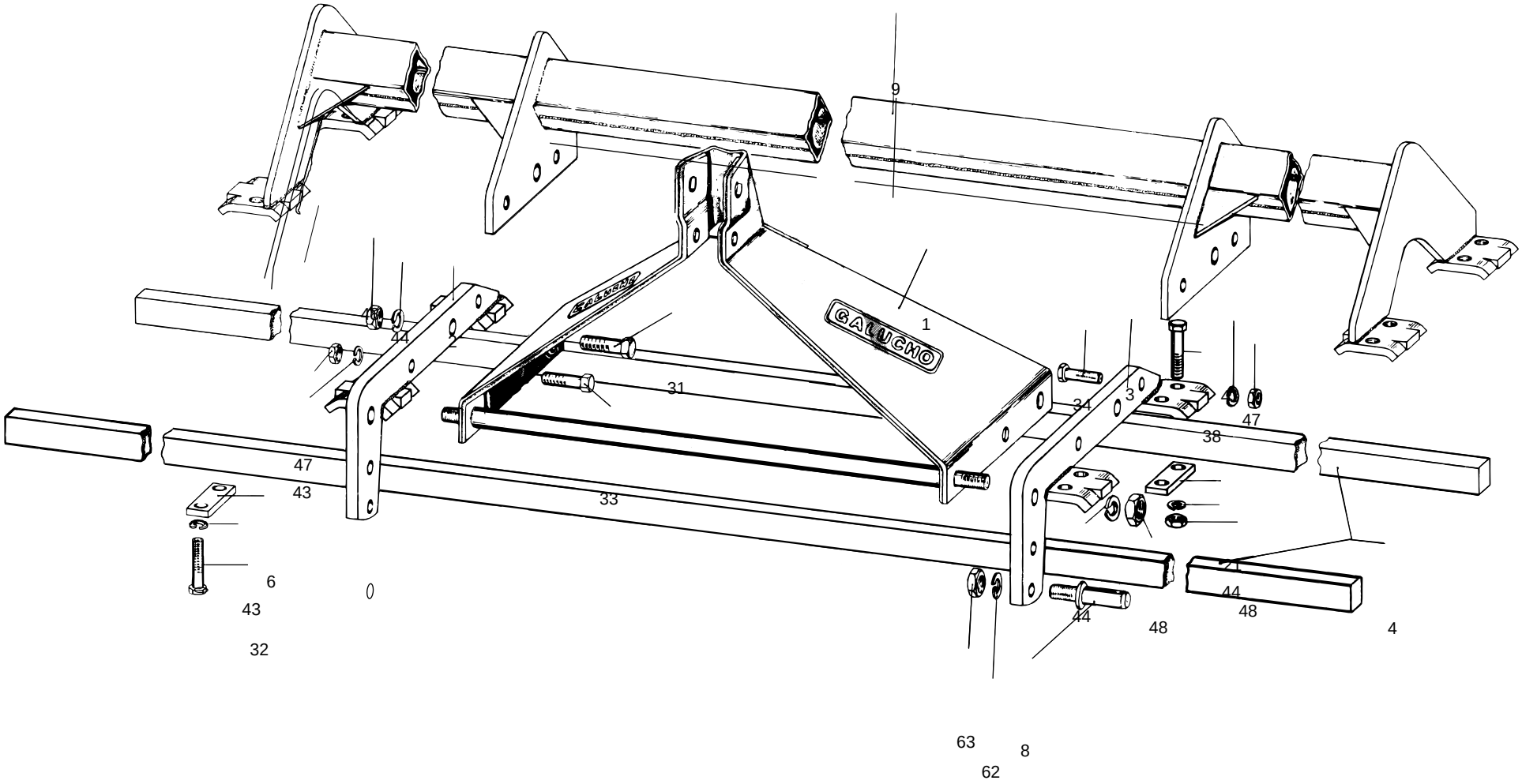
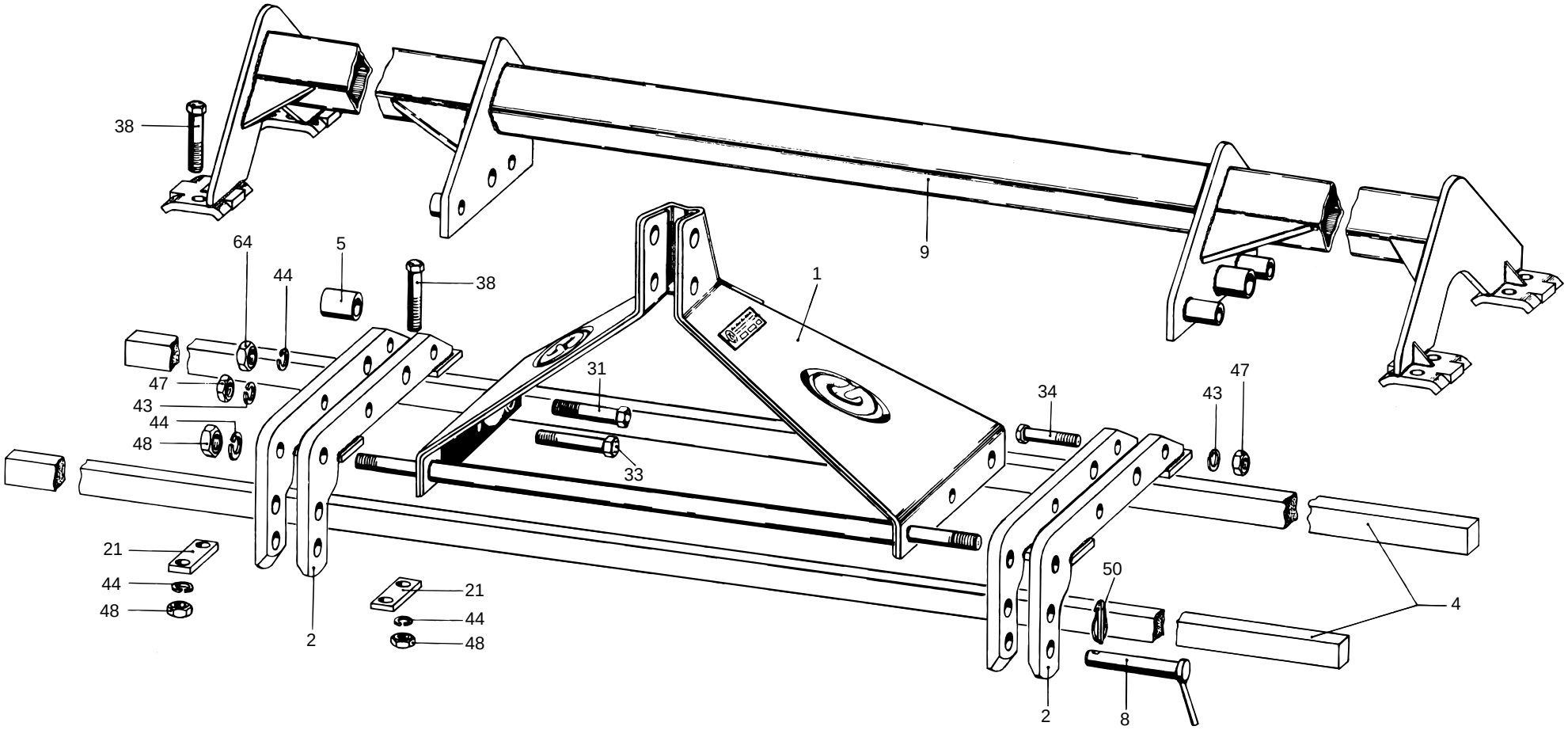


E-13D

Desen.	Verif.	Alter.	Designa. SPRING LOADED TINE TILLERS	Serie ED	GALUCHO INDÚSTRIAS METALOMECÂNICAS, S.A. S. JOÃO DAS LAMPAS - PORTUGAL
Data ___/___/___	Data ___/___/___	Data ___/___/___		Cod. 29226CP02	



E-15D
E-17D
E-19D
E-21D

Desen.	Verif.	Alter.	Designa. SPRING LOADED TINE TILLERS	Serie **ED**	**GALUCHO** INDÚSTRIAS METALOMECÂNICAS, S.A. S. JOÃO DAS LAMPAS - PORTUGAL
Data ___/___/___	Data ___/___/___	Data ___/___/___		Cod. 29227CP03	

NOTES:

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GALUCHO - INDÚSTRIAS METALOMECÂNICAS, S. A.

(Fundada por JOSÉ FRANCISCO JUSTINO)

AV. CENTRAL, N.º4
2705-737 S. JOÃO DAS LAMPAS - SINTRA, PORTUGAL
TELEF.:(351) 21 960 85 00
FAX: (351) 21 960 85 99

www.galucho.pt
info@galucho.pt